The Robert J. Parks Collection, 1945-1966
1.2 cubic feet
JPL 174

Biography

Robert J. Parks was born April 1, 1922, in Los Angeles, CA. He earned a Bachelor of Science degree in electrical engineering at the California Institute of Technology (Caltech) in 1944. Parks then served two and a half years in the Army, and six months at Hughes Aircraft before joining the Jet Propulsion Laboratory (JPL) in April 1947. Parks retired from JPL in June 1987.

Parks' career at JPL:
Engineer, Guidance and Control Section, 1947-50
Chief, Section 12, Guidance and Control Section, 1950-52
Chief, Section 12, Guidance Analysis Section, 1952-56
Staff Engineer, 1956
Chief, Guidance Research and Development Division, 1956-57
Project Director, Sergeant, 1957-60
Chief, Department of Guidance and Control, 1959-60
Program Director, 1960-1961
Program Director, Planetary Program, 1961-63
Project Director, Mariner Project, 1961-62
Manager, Mariner-C Project, 1962
Manager, Mariner B Project, 1962-63
Assistant Laboratory Director for Lunar and Planetary Projects, 1963-68
Project Manager, Surveyor, 1965-66
Assistant Laboratory Director for Flight Projects, 1968-1981
Project Manager, Voyager, 1978-1979
Associate Director for Space Science and Exploration, 1981-1984
JPL Deputy Director, 1984-1987

Parks was awarded with the NASA Public Service Award in 1963 and the NASA Exceptional Service Medal in 1967. Amongst his honors, Parks was awarded the Louis W. Hill Award in 1963, and the Goddard Astronautics Award in 1980, both from the American Institute of Aeronautics and Astronautics (AIAA), and the Stuart Ballantine Medal from the Franklin Institute in 1967. In 1973, Parks was elected to the National Academy of Engineers.

Provenance

The collection was transferred from the office of Judy Levstik, Section 100, Office of the Director, to the JPL Archives on July 1, 1992. It became Accession 1992-60.

Collection Arrangement and Description

The items in the collection were collected by Robert J. Parks and at some point were transferred over to the Office of the Director. Represented in the collection are correspondence, handwritten notes, memoranda, journal articles, brochures, and photographs. The earliest item in the collection is a journal article from 1945; the latest items are Surveyor 1 photographs from 1966. The bulk of the collection is between 1948-1961.

The collection had no inherent arrangement when accessioned and so was divided during processing into six series: Contract JPL-15, JPL Reports, Journal Reprints, Flight Projects, Deep Space Network, and Miscellaneous. Materials were arranged chronologically within each series unless otherwise noted.

Contract JPL-15 (Box 1; folders 1-8).

At a conference held at Wright Field, Ohio in May 1948, the U.S. Air Force Air Materiel Command assigned JPL a project to evaluate and assess the guidance and control of guided missile projects underway at eight different contractors. This project, Contract W33-038-AC-18709, was known as JPL-15.

The eight contractors (and their missiles) that were evaluated were: Bell Aircraft Company (MX-776 Shrike/Rascal), Boeing Aircraft Company (MX-606 Ground-to-Air Pilotless Aircraft [GAPA]), Ryan Aeronautical Company (MX-799 Firebird), Hughes Aircraft Company (MX-904 Tiamat), University of Michigan (MX-794 Wizard), North American Aviation Company (MX-770 NATIV), Glenn L. Martin Company (MX-771A Matador) and Northrop Aircraft Company (MX-775B Snark).

The first evaluation, Bell Aircraft Company, began in June 1948. Robert Parks was one of the engineers who traveled to the contractor sites to consult with engineers on the various projects. In December 1948 he traveled to Seattle to visit Boeing. In April 1949 he traveled to Ann Arbor, Michigan to evaluate the University of Michigan. Immediately after this he went to Baltimore to the Glenn L. Martin Company.

The majority of the series is comprised of handwritten notes. Also included in the series are memoranda, correspondence and travel forms. A majority of the memoranda in the series were originally marked as "Secret," but have all been declassified.

JPL Reports (Boxes 1-2; folders 9-24).

The series is comprised of reports written by JPL personnel. The majority of the reports are dealing with the problem of guidance systems on missiles or satellites.

The ORDCIT (Ordnance Department-California Institute of Technology) Project, also known as JPL-4, was a research and development program on long-range, jet-propelled missiles ran by JPL for the Ordnance Department of the U.S. Army. The project included the Private and Corporal missiles and their variations, and culminated in the Sergeant missile, of which Parks was project director from 1957 to 1960. The ORDCIT project was the Lab's main project before being absorbed by the National Aeronautics and Space Administration in 1959.

Journal Reprints (Box 2; folders 25-41).

This series is exclusively comprised of journal reprints of articles and reports collected by Parks that were written by people not affiliated with JPL. They are organized chronologically. The dates of some that are unidentified were estimated when possible.

The articles are primarily dealing with physics or mathematics. There is one mathematical paper from the Flight Determination Laboratory of White Sands Proving Ground. The *Journal of Applied Physics* and *Bell System Technical Journal* are both represented with multiple articles.

The February 18, 1958 report "Minimum Life Standards" is a short report about the minimum requirements and tolerances for continuation of life in orbiting vehicles. Requirements for humans as well as dogs and rats and the amount of oxygen and energy requirements each species needs, the oxygen and caloric consumption, the water balance, and the tolerances to extremes of temperatures are also noted in tables.

Flight Projects (Box 3; folders 42-52).

The Flight Project series contains information documenting various projects JPL was involved with. The projects include Sergeant, Explorer 1, Pioneer 4, Mariner-R and Surveyor.

Sergeant

The Sergeant Missile was a short-range, surface-to-surface missile designed to replace the Corporal Missile. In January 1955, JPL began the development of the Sergeant missile as a continuation of the ORDCIT Project (JPL-4), which had earlier developed the Private and Corporal Missiles.

In February 1956, Sperry Gyroscope Company was chosen as a subcontractor for the Sergeant missile. In July 1960, JPL ended its involvement with the Sergeant project and Sperry Utah Corporation assumed the role of prime contractor.

Represented in the collection are pamphlets on the Sergeant Missile System and the Sperry Utah Engineering Laboratory and six photographs documenting the Sergeant missile as well as an exterior photograph of the Lab from the same time period.

Explorer 1

Explorer 1 was the first United States artificial satellite. It was launched from a Jupiter C launch vehicle on January 31, 1958. Represented in the collection is a book of reproduced congratulatory letters regarding the successful launching of Explorer 1. The JPL pamphlet "Space Explorers," issued in July 1958, examined the first three Explorer probes.

Pioneer 4

Pioneer 4 was launched into a heliocentric orbit on March 3, 1959. Its mission was to measure radiation near the Earth and Moon. It was the first American probe to escape Earth orbit into a heliocentric orbit. Although aimed at the Moon, it passed within 37,300 miles of its target on March 4, 1959. The probe set a new long-distance communication record of 407,000 miles before contact was lost on March 6, 1959 when the mercury batteries were exhausted. Represented in the collection is a pamphlet "The Moon Probe Pioneer IV."

Mariner-R (Mariner-Ranger; Mariner 1-2)

Mariner-R was the project name for what became the Mariner 1 and 2 probes. The earlier Mariner A project was cancelled in 1960, and replaced with a cheaper spacecraft design based on the Ranger probes, and named "Mariner-R."

Mariner 1 was destroyed by the range safety officer on July 22, 1962, shortly after launch as it veered off-course. Mariner 2 was launched on August 27, 1962, and flew by Venus on December 14, 1962. It was the first successful planetary flyby mission.

Represented in the series is an undated document explaining the scientific experiments planned for Mariner-R, and one file of three drawings of the Mariner-R spacecraft, identifying all the spacecraft components. Also in the series is a JPL Technical Report, "The Mariner Planetary Communication System Design," written by Benn D. Martin, and originally presented at the Second Annual Committee on Space Research (COSPAR) symposium in Florence, Italy, on April 12, 1961.

Surveyor

Surveyor was a soft-lander lunar probe series, successor to the hard lunar impact Ranger probes. The Surveyor probes were designed to serve in a support role with the Apollo manned lunar program. There were seven Surveyor probes from 1966-68, five of them successful. Represented in the collection are 17 photographs and lithographs illustrating the Surveyor program. Included are charts, lists, maps of landing sites, graphs, and photographs.

Deep Space Network (Box 3; folders 53-55)

The Deep Space Network (DSN) is a network of communications antennas that monitor communications with spacecraft, both manned and robotic. The DSN was built originally to communicate with the Pioneer and Ranger probes of the early 1960s. The three original locations for the antennas comprising the DSN were Goldstone, California; Canberra, Australia; and Johannesburg, South Africa. Beginning in the mid-1960s, installations near Madrid, Spain replaced Johannesburg as part of the DSN.

The collection includes three reports that reflect the origins of the DSN, and are unique enough to be given their own series. They are key documents in the formation of the DSN.

The "Radio Astronomy Handbook," dated February 1958 and written by William D. Merrick is a working handbook in the development of the Deep Space Network. Included in the handbook is a complete list of all existing observatories and their locations, along with short profiles of companies that could be contracted in assisting JPL personnel to construct radio astronomy antennas.

"A Study of On-Site Computing and Data Processing for a World Tracking Network," JPL Publication 155, was dated February 9, 1959 and written by Clarence R. Gates and Marshall S. Johnson. It is a study formulating the requirements for operations to be performed on tracking or antenna-acquisition data at the individual sites of what was then called a World Tracking Network.

The "South African Trip Report" is a travel report by Jack N. James and Phil A. Tardini on their trip to the Union of South Africa as a potential site for a NASA Deep Space Station. James, Tardini, and two

other NASA personnel were in South Africa from September 26 to October 5, 1959. The group met with officials from the National Institute for Telecommunications Research (NITR), a unit of the South African government's Council for Scientific and Industrial Research (CSIR). The objectives were to narrow potential sites based on geographical, topological and logistical considerations; a discussion of a possible agreement with South African officials; and to gather general information on South Africa. Each of the three objectives is given adequate discussion in the report.

The city of Johannesburg was described as being similar to a U.S. city circa 1936. There was a mention of the apartheid policy of the then-ruling Afrikaans Nationalist Party, although it was not mentioned as a drawback to locating a DSN site there. Also in the report are summaries of briefings and topographical maps of possible site locations.

DSS 51, a 26-meter L and S-band antenna, located at Hartbeesthoek, outside of Johannesburg, became operational in June 1961. The station ceased operations for the DSN in June 1974, due officially to changing requirements for planetary flight programs. The antenna was transferred to NITR, which configured it for radio astronomy research that continues to the present day.

Miscellaneous (Boxes 3-4; folders 56-74).

The Miscellaneous series includes any documents and items that did not fit into the other series or did not form their own series. Included in the series are memoranda, organization charts, draft copies of manuscripts, handwritten notes and mathematical equations and calculations.

Included is a 1955 file confirming security clearance for Robert Parks as a consultant, from the Department of the Air Force. The project is unspecified, although it was probably related to consulting work Parks was involved with at the Ramo-Wooldridge Corporation. While still a JPL employee, Parks did some consulting work for the Guided Missile Research Division of the Ramo-Wooldridge Corporation in 1955. Parks assisted in formulation and analysis of Missile Guidance System Philosophy and development of Missile Guidance System mechanization. Director of the Division was Louis G. Dunn, who served as JPL Director from 1946 to 1954. Also part of the Division at Ramo-Wooldridge was the Director of Electronics Research and Development James C. Fletcher, who was later to serve as NASA Administrator from 1971 to 1977 and 1986 to 1989. Represented in the file are memoranda, organization charts, and security requirements checklists. In 1958, the Ramo-Wooldridge Corporation merged with Thompson Products, forming TRW, Inc.

In September 1959, Parks was invited to contribute a chapter for the forthcoming *Handbook of Astronautical Engineering*, published by McGraw-Hill. Included in the series are correspondence between Parks and H. H. Koelle, editor of the volume, as well as several rough drafts of Parks' chapter, "A General Description of the Guidance Problem."

Located at the end of the Miscellaneous series are six folders composed primarily of handwritten mathematical equations and calculations, most undated.

Conservation/Preservation

Standard preparations of documents for long term storage were completed.

Separation Statement

An original accession (1992-60) was split up into two separate collections: the Robert J. Parks Collection (this collection), and the Harris M. Schurmeier Collection (JPL 173).

Finding Aids

No other finding aids exist for the collection.

FILE FOLDER LIST

Box 1 of 4 – JPL-15 Evaluation Contract

Fld. 1 JPL-15 Evaluation Contract, Notes, 1948-1949.

Fld. 2 Robert Parks Travel and Expense Authorization Reports, 1948-1949.
Fld. 3 Bell Aircraft, MX-776, Shrike/Rascal, June 1948-January 1949.
Fld. 4 Boeing Aircraft, MX-606, GAPA, October 1948-January 1949.
Fld. 5 Ryan Aeronautical, MX-799, Firebird, January-March 1949.
Fld. 6 Northrop Aircraft, MX-775B, Snark, February 1949.
Fld. 7 North American Aviation, MX-770, NATIV, July 25, 1949.
Fld. 8 University of Michigan, MX-794, Wizard, August 15, 1949.

JPL Reports

Fld. 9 R. M. Stewart, Lecture Notes on Advanced Communication Theory, Electrical Engineering Department, California Institute of Technology, 1952-53. [folder 1 of 2]
Fld. 10 [folder 2 of 2]
Fld. 11 Frank W. Lehan, Robert J. Parks, "Optimum Demodulation," with notes, 1953.
Fld. 12 R. M. Stewart, Robert J. Parks, "Degenerate Solutions and an Algebraic Approach to the Multiple-Input Linear Filter Design Problem," *IRE Transactions on Circuit Theory*, March 1953.
Fld. 13 Eberhardt Rechtin, "The Design of Optical Linear Systems," April 1953.
Fld. 14 T. W. Layton, "Some Notes on the Physical Basis of the Quantum Theory," November 10, 1953.

Box 2 of 4

Fld. 15 Frank W. Lehan, "The Doppler Tracking Filter Problem," ORDCIT Project, Section Report 8-506, May 1, 1954.
Fld. 16 Frank W. Lehan, "Generalized Optimum Demodulation," ORDCIT Project, Section Report 8-505, May 13, 1954.
Fld. 17 M. Chester, R. J. Parks, "Velocity Estimate from Combined Radio and Inertial Data," ORDCIT Project, Section Report No. 12-138, January 6, 1955.
Fld. 18 Robert J. Parks, Robert M. Stewart, "The Application of Noise and Filter Theories to Guidance Problems," ORDCIT, External Publication No. 352, July 31, 1956.
Fld. 19 K. Linnes, Eberhardt Rechtin, "Application of Microlock to IGY Satellite Instrumentation," ORDCIT, External Publication 404, July 26, 1957.
Fld. 20 Norman W. Albright, "The Transformation of Earth-Referenced Data to Inertial Coordinate Systems," JPL Progress Report No. 30-5, January 30, 1959.
Fld. 21 Charles T. Butler, William A. Baum, "The Measurement of Integrated Extraterrestrial Radiation by Means of a Satellite-Borne Photometer," ORDCIT Publication 151, February 11, 1959.
Fld. 22 Benn D. Martin, "A Coherent Minimum-Power Lunar-Probe Telemetry System," ORDCIT External Publication 610, May 12, 1959.
Fld. 23 C. G. Pfeiffer, "Guidance for Space Missions," External Publication 656, June 12, 1959.
Fld. 24 Naxwell Noton, "Interplanetary Post-Injection Guidance," External Publication No. 653, June 14, 1959.

Journal Reprints

Fld. 25 Ming Chen Wang, G. E. Uhlenbeck, "On the Theory of the Brownian Motion II," *Review of Modern Physics*, vol. 17, no. 2/3, April-July 1945.
Fld. 26 John R. Ragazzini, Lotfi A. Zadeh, "Probability Criterion for the Design of Servomechanisms," *Journal of Applied Physics*, vol. 20, February 1949.
Fld. 27 R. M. Page, "Comparison of Modulation Methods," Naval Research

Laboratory Reprint No. 18-53, c. 1950.

Fld. 28 Norman Levinson, "The Wiener RMS Error Criterion in Filter Design and Prediction," unknown publication, c. 1950.

Fld. 29 J. J. Gilvarry, S. H. Browne, I. K. Williams, "Theory of Blind Navigation by Dynamical Measurements," *Journal of Applied Physics*, August 1950.

Fld. 30 Harold J. Hansen, Lear Incorporated, "Analysis of Stable Platform with Simplification to Single Principle Axis Including Instantaneous Torque and Acceleration Reactions," January 12, 1953.

Fld. 31 Harry Urkowitz, "Filters for Detection of Small Radar Signals in Clutter," *Journal of Applied Physics*, August 1953.

Fld. 32 "Selected Bibliographies of Reports Prepared by the Instrumentation Laboratory: Part 2- Selected Bibliography for Automatic Flight Control," MIT Instrumentation Laboratory, October 1953.

Fld. 33 Robert E. Beach, "A Question of Property Rights: The Government and Industrial Know-How," *American Bar Association Journal*, November 1953.

Fld. 34 Charles A. Bodwell, "Least Squares Smoothing by Means of the Orthogonal Polynomials and the Analysis of Variance," Flight Determination Laboratory, Holloway Branch, White Sands Proving Ground, March 16, 1956.

Fld. 35 Edward F. Davis, "Phase Stabilization to Microwave Frequency Standards," California Institute of Technology, July 25, 1956.

Fld. 36 J. Whittick, R. F. Muraga, "Minimum Life Standards," Analytical Laboratory Report No. 58-2, February 18, 1958.

Fld. 37 W. F. Sampson, "Comparative Noise Performance of Phase-Lock and Pulse Counting Discriminators," Hallimore Electronics Company, February 28, 1958.

Fld. 38 S. O. Rice, "Mathematical Analysis of Random Noise," *Bell System Technical Journal*, c. 1958.

Fld. 39 "Theory of Radar Information- The Moving Target" TRE Technical Note, no. 108, c. 1958.

Fld. 40 W. R. Bennett, "Response to a Linear Rectifier to Signal and Noise," *Bell System Technical Journal*, c, 1958.

Fld. 41 *Astronautics*, Third Astronautics Annual, November 1960.

Box 3 of 4 – Flight Projects

Fld. 42 Photographs, Corporal Missile, JPL exteriors, Sergeant Missile, 1950s. [7 photographs]

Fld. 43 "The Sergeant Guided-Missile System," pamphlet, c. 1957.

Fld. 44 "Sperry Utah Engineering Laboratory," pamphlet, c. 1957.

Fld. 45 "Explorer 1 – 31 January 1958," book of congratulatory letters, 1958.

Fld. 46 "Space Explorers," JPL pamphlet, July 1958.

Fld. 47 "The Moon Probe Pioneer IV," JPL pamphlet, c. 1959.

Fld. 48 "Juno," pamphlet, c. 1959.

Fld. 49 Scientific Experiments for Mariner R, c. 1960.

Fld. 50 Mariner R drawings, c. 1960. [3 illustrations]

Fld. 51 Benn D. Martin, "The Mariner Planetary Communication System Design," Technical Report 32-85, Rev. 1, May 15, 1961.

Fld. 52 Surveyor photographs and lithographs, 1966. [17 photographs/lithographs]

Deep Space Network

Fld. 53 W. D. Merrick, "Radio Astronomy Handbook, or 'A Handy-Dandy Do It Yourself Guide to Junoesque Loving Cups," February 1958.

Fld. 54 C. R. Gates, M. S. Johnson, "A Study of On-Site Computing and Data

Processing for a World Tracking Network," JPL Pub. No. 154, February 9, 1959.
Fld. 55 South African Trip Report, September-October 1959.

Miscellaneous
Fld. 56 Rechtin, Eberhardt, notes, memoranda, 1951-1952.
Fld. 57 "Feedback Control Systems I," Caltech course, notes by C. H. Wilts, January 1952.
Fld. 58 W. H. Woodward, "Guided Missile Gunnery, A Study by the Artillery School Board," December 4, 1952.
Fld. 59 Institute of Radio Engineers, 1952.
Fld. 60 Convention Record of the Institute of Radio Engineers, Part 8-Information Theory, March 23-26, 1953.
Fld. 61 Parks, Robert J., Security Clearance Notification from Department of Defense, August-September 1955.
Fld. 62 Ramo-Wooldridge Corporation, Guided Missile Research Division, 1955.
Fld. 63 Gates, Clarence R., memoranda, 1956.

Box 4 of 4
Fld. 64 "Tour at AOMC, August 1958," ledger.
Fld. 65 Ray Film Industries, April 1959. [two photographs]
Fld. 66 Handbook of Astronautical Engineering, correspondence and rough draft, September 1959-June 1960.
Fld. 67 Space Guidance Systems, lecture notes, drawings, c. 1960.
Fld. 68 Parks, Robert, three small photographs, c. 1960.
Fld. 69 Hibbs, Al, memoranda, calculations, n.d.
Fld. 70 Guidance and Control, equations and calculations, 1953.
Fld. 71 Calculations/Equations, 1957.
Fld. 72 Parks, equations, n.d. [folder 1 of 3]
Fld. 73 [folder 2 of 3]
Fld. 74 [folder 3 of 3]

CATALOG DESCRIPTION

Robert J. Parks Collection, 1945-1966 (bulk: 1948-1961)
1.2 cu. ft. (4 boxes; 74 folders)

The items in the collection were collected by Robert J. Parks. Parks' career at the Jet Propulsion Laboratory (JPL) lasted from 1947 to 1987. During the span dates of the collection, Parks served as an Engineer in the Guidance and Control Section (1947-50), Chief of the Guidance Section and its various incarnations (1950-60), Project Director of the Sergeant Missile Program (1957-60), and Flight Projects Director (1961-84).

Represented in the collection are correspondence, reports, journal reprints, handwritten notes, brochures, and photographs. The collection is divided into six series: Contract JPL-15, JPL Reports, Journal Reprints, Flight Projects, Deep Space Network, and Miscellaneous. The bulk of the collection is between 1948-1961.

Finding aid available in the repository.

Tracings
Jet Propulsion Laboratory – History
TRW, Inc.
Ramo-Wooldridge Corporation

Bell Aircraft Company
Boeing Aircraft Company
Ryan Aeronautical Company
Hughes Aircraft Company
University of Michigan
North American Aviation Company
Glenn L. Martin Company
Northrop Aircraft Company
Guided Missile Evaluation Contract
ORDCIT
Sergeant Missile
Guidance Systems
Sperry Utah Engineering Laboratory
Explorer 1
Pioneer 4
Mariner-R
Mariner 2
Deep Space Network
Parks, Robert J., 1922-
Dunn, Louis G., 1908-1979
Pickering, William H., 1910-
Seifert, Howard S.
Wooldridge, Dean W.
James, Jack N., 1920-
Tardini, Phil A.
Fletcher, James C., 1919-1991
Lehan, Frank W.
Stewart, Robert M.
Rechtin, Eberhardt, 1926-
Martin, Benn D.
Gates, Clarence R., 1926-
Merrick, William D.
Johnson, Marshall S.
Hibbs, Al, 1924-

Part of Accession 1992-60.